

REMARKS

Rejections Under 35 U.S.C. § 112

The examiner rejected claims 168-259 on the grounds that the expression “aqueous material” lacks description in the specification as filed. Claims 168, 205, and 226 have been amended to use the word “water” in place of “aqueous material.” The amendment does not narrow the claims. A process in which a crude phenol bottoms stream is treated with water also is a process in which the crude phenol bottoms stream is treated with an “aqueous material.” The claim preamble is open ended (“comprising”), and the specification clearly teaches that the “water” is not necessarily pure water:

Water can be added as a liquid or vapor, preferably as a liquid. **Water can also be added as a fresh stream or as a recycle stream originating from the bottoms phase separator (80), preferably the latter.** Water may be added before, simultaneous to, or after the diluent is added. In one embodiment, water is added to the diluted crude phenol bottoms stream through line (82) originating from a bottoms phase separator (80). **A typical non-limiting example of the water stream composition comprises 90-95 wt.% water, 3-7 wt.% salts of neutralization, and 0.5-3 wt.% of phenol.**

Specification, p. 21, ll. 28 - p. 22, l. 5 (emphasis added).

Rejection of Claims 156-167 under 35 U.S.C. § 112, paragraphs (1) and (2)

The examiner maintained the rejection of claims 156-167 under 35 U.S.C. § 112, first and second paragraphs. According to the examiner:

Regardless of whether one can characterize the claims as means plus function claims, the argument fails to recognize that the application as filed did not provide for the present claim language. The present claim language by its nature necessarily is of different scope than the specific embodiments pointed to by applicants. Such difference in scope of the claimed embodiments and those disclosed in the specification are neither disclosed nor enabled in the specification as filed. If the claims are intended to be limited to the specific embodiments in the specification pointed to by applicants, then it is suggested that these embodiments be incorporated into the claims.

Response

As an initial matter, claim 156 has been amended so that the last phrase reads as follows:

means for phase separating at least a portion of said remainder of said phenolic compounds from said crude phenolic bottoms stream into an organic phase comprising an organic diluent, said means comprising treating said a crude

phenolic bottoms stream with a first quantity of water and with a second quantity of said organic diluent.

The amendment does not narrow claim 156 because, as correctly interpreted under 35 U.S.C. § 112(6), the claim included the foregoing limitations.

The examiner's interpretation of claims 156-167 was and is **legally incorrect**. The examiner argued that the "present claim language by its nature necessarily is of different scope than the specific embodiments pointed to by applicants." According to the examiner, claims 156-167 are **not** "limited to the specific embodiments in the specification pointed to by applicants" unless "these embodiments are incorporated into the claims." Paper No. 20, p. 2.

In fact, under 35 U.S.C. § 112(6), claim 156 expressly and statutorily incorporates embodiments described in the specification into the claims. As explained by the Federal Circuit:

Unlike the ordinary situation in which claims may not be limited by functions or elements disclosed in the specification, but not included in the claims themselves, in writing a claim in means-plus-function form, **a party is limited to the corresponding structure disclosed in the specification and its equivalents.**

Kahn v. General Motors Corp., 135 F.3d 1472, 1476, 45 U.S.P.Q.2d 1608, 1611 (Fed. Cir. 1998), *cert. denied*, 525 U.S. 875 (1998) (emphasis added), *rehearing, en banc, denied*, 1998 U.S.App.LEXIS 6873 (Fed. Cir. March 26, 1998):

In the previous office action, the examiner argued that

The only method of treating the crude bottoms stream described in the specification requires adding a) water and b) a diluent composition with subsequent separation into a hydrocarbon phase and aqueous phase. These claims do not set forth these critical features.

Paper No. 18, p. 3. **If the examiner accurately characterized the specification, then as a matter of law, claims 156-167 under 35 U.S.C. § 112(6) already did incorporate the recited features.** The claim language, even before amendment, was not "necessarily of different scope than the specific embodiments pointed to by Applicants." In any event, Applicant has amended claim 156 to expressly incorporate the features referred to by the examiner.

Applicant respectfully requests that the rejection of claims 156-167 be withdrawn.

**Rejection of Claims 169, 176, 183, 191, 192, 206, 213, 220,
and 226-259 under 35 U.S.C. § 112, first and second paragraphs**

The examiner rejects claims 169, 176, 183, 191, 192, 206, 213, 220, and 226-259 under the first and second paragraphs of 35 U.S.C. § 112. According to the examiner, the specification does teach that the density of the organic diluent has an effect on the phase separation, but there is nothing in the specification that asserts that the density of the diluent has anything to do with the “attraction of the phenol thereto.”

Claims 169, 206, and 226 have been amended to specify that the “organic diluent has a first density sufficiently less than a second density of phenol to phase separate said remainder of said phenolic compounds from said mixture into an organic phase comprising said organic diluent.” Allowed claims 125-128 have been amended similarly for consistency. The amendment does not change the scope of the claims, and is believed to overcome the rejection.

Applicant respectfully requests withdrawal of the rejection.

Rejection of claims 156 and 160-167 under 35 U.S.C. § 102(b)

The examiner rejects claims 156 and 160-167 as anticipated by both USP 3,850,996 and 2,715,145. According to the examiner “[t]he limitation as to organic phase is not required by the instant claims.”

Response

In fact, claim 156, from which claims 160-167 directly or indirectly depend, previously included the following limitation: “means for separating at least a portion of said remainder of said phenolic compounds from said crude phenolic bottoms stream **into an organic phase**” (emphasis added). The rejection therefore was factually incorrect even before the amendments.

In any event, claim 156 has been amended to clarify: that the means for separating is a means for “phase” separating; that the organic phase compris[es] an organic diluent”; and, that the means for phase separating comprises “treating said crude phenolic bottoms stream with a first quantity of water and with a second quantity of said organic diluent.” The examiner has not pointed to a teaching or suggestion of every limitation of claims 156 and 160-167 in USP 3,850,996 and 2,715,145, for reasons set forth above, and in the previous responses.

As previously explained, both the '996 patent and the '145 patent teach **pyrolyzing** a stream which allegedly corresponds to the crude phenolic bottoms stream of the claims. '996 patent, col. 2, ll. 2-27 (emphasis added). '145 patent, col. 2, ll. 1-4 (emphasis added). The examiner has **not** pointed to a teaching in the '996 patent to phase separate a crude phenolic bottoms stream to separate the phenol into an organic phase.

Applicant respectfully requests that the anticipation rejection be withdrawn.

**Rejection of claims 156 and 160-167 as obvious over
USP 3,850,996 and USP 2,715,156**

The examiner maintained the rejection of claims 156 and 160-167 as obvious over USP 3,850,996 and USP 2,715,145.

Response

In order to establish a case of *prima facie* obviousness of claims 156-167 over the '996 patent in view of the '145 patent, the examiner must point to a teaching or suggestion **in the cited references** that would motivate a person of ordinary skill in the art to add water and an organic diluent to the alleged "crude phenolic bottoms stream" in the '996 patent rather than to pyrolyze that stream. MPEP 2143.01; *In re Brouwer*, 37 U.S.P.Q.2d 1663, 1666 (Fed. Cir. 1995). The examiner has not pointed to any such teaching or suggestion. The examiner therefore has not established a case of *prima facie* obviousness over the '996 patent in view of the '145 patent.

The examiner certainly has not pointed to a teaching of a process where the organic phase comprises a weight ratio of organic diluent to crude phenolic bottoms stream recited in claims 157-159, or in which 80 or 90 wt.% salts of neutralization are removed in one or more aqueous streams, as recited in claims 160-167. Nor has the examiner pointed to a teaching or suggestion that would motivate a person of ordinary skill in the art to modify the '996 patent in the manner required to result in the process of claims 157-167.

For the foregoing reasons, Applicant respectfully requests that the examiner withdraw the rejection of 156-167 as obvious over the '966 patent and/or the '145 patent.

Rejection of Claims 156-259 as anticipated by USP 2,727,074

The examiner maintained the rejection of claims 156-259 as anticipated by USP 2,727,074.

Response

Applicant expressly withdraws arguments previously made with respect to the '074 patent, which may have contained some technical error(s).

The '074 patent teaches a method in which, after a majority of phenol is removed by various means, a remainder of phenol is extracted into a "lower aqueous solution" from which the phenol is obtained by "acidification":

Phenol and acetophenone together with byproducts of the reaction and some resinous matter formed by polymerisation of methylstyrene remain in the still. On continuing the distillation the greater part of the phenol distils over until about 90 to 95% of the total phenol has been removed. The next fraction consists of an azeotropic mixture of phenol and acetophenone. This mixture is then extracted by means of an aqueous sodium hydroxide solution containing about 10 grams of sodium hydroxide in 100 cc. **To the mixture an amount of hydrocarbon such as isopropylbenzene is added which is approximately equal to the amount of phenol contained in the mixture. The mixture separates readily into two phases, the upper phase comprising the greater part of the acetophenone and the hydrocarbon and also a small amount of phenol as sodium phenate, and the lower phase comprising the phenol to which only a small proportion of acetophenone is admixed. By distilling the upper phase the acetophenone is separated from the isopropylbenzene and the sodium phenate can thus be recovered in a practically pure state. From the *lower aqueous solution* the phenol containing only a small amount of acetophenone is obtained by *acidification*, for instance with carbon dioxide.**

'074 Patent, col. 2, ll. 22-45 (emphasis added). See also col. 2, ll. 62-66. Alternative embodiments involve: "subjecting the still residue after acetone, any isopropylbenzene present, methylstyrene and the greater part of the phenol have been distilled off, to **extraction by means of aqueous sodium hydroxide solution** according to the process of the invention (col. 2, l. 69-col. 3, l. 1, emphasis added); or, "subjecting the residue which may still contain all the phenol produced by the catalytic decomposition of isopropylbenzene hydroperoxide, or only a part of it after having distilled off a major part, to **pyrolysing heat treatment**" (col. 3, ll. 8-11, emphasis added).

The examiner has not established that the '074 patent *prima facie* anticipates of claims 156-259 because the examiner has not pointed to a teaching or suggestion of the following limitations of claims 156-259 in the '074 patent: "means for *phase separating* at least a portion of said remainder of said *phenolic compounds* from said crude *phenolic bottoms stream* into an organic phase comprising an organic diluent" in the

'074 patent (claim 156, emphasis added); "recovering said phenolic compounds in an organic phase comprising said organic diluent" (claim 168 and 205); or "allowing said mixture to phase separate to produce an organic phase comprising said phenolic compounds and said organic diluent." Claim 226 and dependent claims.

The examiner argued that "[t]he diluent recited in some of the independent claims reads on the isopropyl benzene added to the residue, e.g., Example 2." However, after addition of isopropylbenzene to the mixture in Example 2, "[t]he upper oil phase contained besides the isopropylbenzene, 97.7% of the total acetophenone and 4.4% of the total phenol as sodium phenate, **while the lower aqueous phase contained 2.3% of the total acetophenone and 95.65% of the total phenol.**" '074 patent, col. 3, ll. 60-64 (emphasis added). Example 2 further teaches that "[t]he acetophenone was recovered from the oily phase by distillation and **the phenol from the aqueous phase by treatment with acid.**" Col. 3, ll. 64-67.

For the foregoing reasons, the examiner has not pointed to a teaching or suggestion in the '074 patent of every limitation of any of the independent claims 156-259. The examiner has not pointed to a teaching of a process comprising the foregoing limitations where the organic phase comprises a weight ratio of organic diluent to crude phenolic bottoms stream recited in claims 157-159, or in which 80 or 90 wt.% salts of neutralization are removed in one or more aqueous streams, as recited in claims 160-167. The examiner clearly has not pointed to a teaching in the '074 patent:

- a. To add an organic diluent having the density specified in claims 169-172, claims 206-209, claims 228-230;
- b. To add an organic diluent to result in the wt.% ratio of claims 189-205 (and dependent claims from 205) or claims 245-259;
- c. To add an organic diluent having the composition of claims 173-174, claims 210-211, claims 231-232; and/or
- d. To remove at least 80 wt.% or 90 wt.% of the salts of neutralization in one or more aqueous streams, as specified in claims 175-188, 212-225, 233-244.

The examiner has not established a case of *prima facie* anticipation of claims 156-259 over the '074 patent. *Atlas Powder Co. v. Ireco Inc.*, 190 F.3d 1342, 1346, 51

USPQ2d 1943, 1945 (Fed. Cir. 1999). Applicant respectfully requests that the anticipation rejection be withdrawn.

Rejection of claims 156-259 as obvious over USP 2,727,074

The examiner rejected claims 156-259 as obvious over the '074 patent.

Response

As explained above with respect to the anticipation rejections, the examiner has not pointed to a teaching or suggestion of every feature of claims 156-259 in the '074 patent.

For ease in discussion, the claimed crude phenolic bottoms stream appears to roughly correspond to the '074 "still residue after acetone, any isopropylbenzene present, methylstyrene and the greater part of the phenol have been distilled off" (col. 2, l. 69-72). The examiner has not pointed to a teaching or suggestion in any reference that would motivate a person of ordinary skill in the art to modify the process(es) described in the '074 patent in the manner required to result in "phase separating at least a portion of . . . phenolic compounds from said [still residue] into an organic phase comprising an organic diluent." Nor has the examiner pointed to a teaching or suggestion in any reference that would motivate a person of ordinary skill in the art to modify the processes described in the '074 patent to result in "recovering said phenolic compounds in an organic phase comprising said organic diluent" (claims 168, 205, and dependent claims) or "allowing said mixture to phase separate to produce an organic phase comprising said phenolic compounds and said organic diluent," claim 226 and dependent claims.

For the foregoing reasons, the examiner has not established a case of *prima facie* obviousness of claims 156-259 over the '074 patent.

Rejection of claims 156 and 160-167 as anticipated under 35 U.S.C. § 102(e) by USP 5,847,235 in view of USP 5,510,543

The examiner maintained the rejection of claims 156 and 160-167 as anticipated under 35 U.S.C. § 102(e) over USP 5,847,235 in view of USP 5,10,543. The examiner previously indicated that the Dyckman '543 patent was not relied upon as prior art, but as evidence that phenol tar is prepared by the cleavage mass treatment steps recited in the claims.

Response

The examiner has not pointed to a teaching or suggestion in the '235 patent of the limitation:

means for phase separating at least a portion of said remainder of said phenolic compounds from said crude phenolic bottoms stream into an organic phase comprising an organic diluent, said means comprising treating said a crude phenolic bottoms stream with a first quantity of water and with a second quantity of said organic diluent.

In fact, the Dyckman '235 patent is directed to "[a] method for reduction of salt content in phenol tars **with no additional solvent**" (Dyckman '235, abstract, emphasis added). Dyckman '235 teaches that:

No extra solvents are employed to dilute the phenol tar to make it less viscous in order to facilitate intimate admixture and then efficient phase separation.

Surprisingly the **direct contact of undiluted phenol tar with water alone** in the present process gives superior extraction performance. Admixture of the phenol tar alone with water alone is usually sufficient as a result of the turbulence from the countercurrent flows in the extractor.

Dyckman '235, col. 3, ll. 4-11 (emphasis added).

The examiner has not established that the '235 patent discloses every limitation of claims 156-167, either explicitly or inherently, and has not established a case of *prima facie* anticipation of the claims 156-167 over the Dyckman '235 patent, alone or in view of the '543 patent. *Atlas Powder Co. v. Ireco Inc.*, 190 F.3d 1342, 1346, 51 USPQ2d 1943, 1945 (Fed. Cir. 1999).

Rejection of claims 156-167 as obvious over USP 5,847,235 in view of USP 5,510,543

The examiner also rejected claims 156-167 as obvious over the USP 5,847,235 in view of USP 5,510,543.

Response

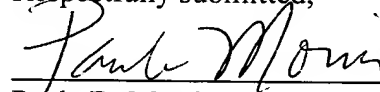
The examiner has not pointed to any teaching or suggestion in any reference that would motivate a person of ordinary skill in the art to modify the Dyckman '235 patent to treat a crude phenolic bottoms stream with water **and with "organic diluent,"** rather than to treat a crude phenolic bottoms stream with "water alone." The examiner therefore has not established a case of *prima facie* obviousness of claims 156-167 over USP 5,847,235 in view of USP 5,510,543.

In fact, the Dyckman '235 teaches away from adding an organic diluent to the crude phenolic bottoms stream. This is "strong evidence of unobviousness." *In re Hedges*, 228 U.S.P.Q. 685, 687 (Fed. Cir. 1986), quoting *W. L. Gore & Assoc. v. Garlock, Inc.*, 220 U.S.P.Q.303, 312 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

CONCLUSION

For all of the foregoing reasons, Applicant respectfully requests entry of the foregoing amendments, and reconsideration and allowance of all of the pending claims. The Commissioner is hereby authorized to deposit any overpayment or to charge any underpayment of fees related to this matter to Deposit Account No. 50-0997, maintained by Paula D. Morris & Associates, P.C.

Respectfully submitted,



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Applicant:	<u>Taggart II, et al.</u>	Group Art Unit:	<u>1621</u>
Serial No.:	<u>09/304,298</u>	Examiner:	<u>Michael L. Shippen</u>
Filing Date:	<u>May 3, 1999</u>	Atty. Docket No.:	<u>SHELL-TH1118</u>
Title:	<u>Removal of Salts in the Manufacture of Phenolic Compound</u>		

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